

## CLAIMS

What is claimed is:

1. A process for managing capacity resources in a shared computing environment

comprising the steps of:

producing and maintaining a capacity plan;

handling capacity requests from a requester;

performing analysis review on capacity requests to identify capacity issues; and

executing a problem manager program in a data-processing system to resolve any identified capacity issues

so that a service provider can meet all service obligations.

2. The process of Claim 1 wherein producing and maintaining the capacity plan comprises

the steps of:

gathering capacity data;

analyzing the capacity data by extracting capacity obligations from a database and

comparing the capacity obligations with existing resources to identify capacity

obligations that can be met with existing resources, and to identify capacity obligations

that require additional resources;

generating the capacity plan for using the identified existing resources and the identified

additional resources to meet capacity obligations;

gaining approval for the capacity plan from one or more persons with the authority to

commit to the implementation of the capacity plan; and

notifying any parties to the capacity plan of the plan details.

3. The process of Claim 2 wherein gathering capacity data comprises the steps of:

determining capacity data requirements;

determining suppliers of the capacity data;

determining if the capacity data is already available;

acquiring the capacity data from the database;

validating the capacity data;

determining if there is a regular need for the data; and

updating and documenting the database.

4. The process of Claim 2 further comprising the steps of:

responsive to determining that the capacity data is not already available,

contacting the capacity data owner;

requesting the capacity data; and

justifying the request for the capacity data to the capacity data owner.

5. The process of Claim 2 further comprising the steps of:

before gaining approval for the capacity plan, designing a configuration to support the capacity plan; and

testing the designed configuration to determine if the configuration is capable of balancing a workload as required to meet existing and anticipated capacity obligations.

6. The process of Claim 2 further comprising the step of, before gaining approval for the capacity plan, analyzing the performance impact of the capacity plan by determining the impact to the components of the capacity plan during the plan period.

7. The process of Claim 1 wherein handling a capacity request comprises the steps of:

- analyzing the capacity request with a problem management program;
- extracting the requester's entitlements and standard data from a database;
- determining if the requester is entitled to have the capacity request satisfied;
- responsive to determining that the requester is entitled to have the capacity request satisfied, determining if any non-standard data is required to satisfy the capacity request;
- responsive to determining that non-standard data is required to satisfy the capacity request, submitting a request for the non-standard data to a collection team,
- receiving the non-standard data from the collection team, and
- reviewing the non-standard data received from the collection team;
- analyzing the capacity plan against actual usage data; and
- updating the capacity plan to reflect the result of the capacity request.

8. The process of claim 7 wherein analyzing the capacity plan against actual usage data comprises the steps of:

- obtaining plan data from the database;
- obtaining actual usage data from the database;
- comparing the plan data with actual usage data;
- determining from the comparison if the actual usage data deviates from the plan data; and

responsive to determining that the actual usage data deviates from the plan data,  
investigating the deviations.

9. The process of claim 8 wherein investigating the deviations comprises the steps of:  
determining if the deviation is the result of an anomaly; and  
responsive to determining that the deviation is a result of an anomaly, documenting the  
deviation.

10. The process of claim 8 wherein investigating the deviations comprises the steps  
of:  
determining if the deviation is the result of a business cycle;  
responsive to determining that the deviation is the result of a business cycle, documenting  
the deviation.

11. The process of claim 8 wherein investigating the deviations comprises the steps  
of:  
determining if the deviation is the result of bad data capture; and  
responsive to determining that the deviation is the result of a bad data capture, documenting  
the bad data capture details with a problem management program and documenting the  
deviation with a problem management program.

12. The process of claim 8 wherein investigating the deviations comprises the steps  
of:  
determining if the deviation is the result of an unknown reason; and

responsive to determining that the deviation is the result of an unknown reason,  
documenting the deviation with a problem management program,  
determining if the deviation is likely to re-occur, and  
responsive to determining that the deviation is likely to re-occur, documenting the  
required capacity plan changes.

13. The process of Claim 1 wherein handling a capacity request comprises the steps  
of:

analyzing the capacity request with a problem management program;  
extracting the requester's entitlements and standard data from a database;  
determining if the requester is entitled to have the capacity request satisfied;  
responsive to determining that the requester is entitled to have the capacity request satisfied,  
determining if any non-standard data is required to satisfy the capacity request;  
responsive to determining that non-standard data is required to satisfy the capacity request,  
submitting a request for the non-standard data to a collection team,  
receiving the non-standard data from the collection team, and  
reviewing the non-standard data received from the collection team;  
managing capacity data for reporting;  
determining if new or changed reports are required;  
responsive to determining that new or changed reports are required, running reports; and  
updating the capacity plan to reflect the result of the capacity request.

14. The process of Claim 13 wherein managing capacity data for reporting comprises  
the steps of:

determining the data required for generating reports;  
determining if additional data elements are needed for generating reports;  
responsive to determining that additional data elements are needed for generating reports,  
requesting the additional data elements from a data collection team, and  
responsive to receiving the additional data elements from the data collection team,  
validating the additional data elements;  
determining the report format;  
determining the frequency and date of reporting;  
determining the destination for the report; and  
notifying a report recipient when the report is available for retrieval from a database.

15. The process of Claim 13 wherein running reports comprises the steps of:  
extracting report specifications from the database;  
creating pre-defined reports with a reporting program;  
determining if the report format or report content requires correction;  
responsive to determining that the report requires correction, making the required changes to  
the report; and  
distributing reports to one or more report recipients.

16. The process of Claim 1 wherein handling a capacity request comprises the steps  
of:

analyzing the capacity request with a problem management program;  
extracting the requester's entitlements and standard data from a database;  
determining if the requester is entitled to have the capacity request satisfied;

responsive to determining that the requester is entitled to have the capacity request satisfied,  
determining if any non-standard data is required to satisfy the capacity request;  
responsive to determining that non-standard data is required to satisfy the capacity request,  
submitting a request for the non-standard data to a collection team,  
receiving the non-standard data from the collection team, and  
reviewing the non-standard data received from the collection team;  
analyzing trends; and  
updating the capacity plan to reflect the result of the capacity request.

17. The process of Claim 16 wherein analyzing trends comprises the steps of:  
identifying relevant trends;  
obtaining historical capacity data from the database;  
determining if a specific analysis is required;  
responsive to determining that a specific analysis is required, determining if additional  
capacity data is available,  
responsive to determining that additional capacity data is not available, requesting the  
additional capacity data from a collection team;  
obtaining the additional capacity data;  
selecting resource types and workload types to identify trends;  
responsive to identifying trends, documenting the trends in the database;  
determining if any identified trends deviate from the capacity plan; and  
responsive to determining that one or more identified trends deviates from the capacity plan,  
investigating the deviations.

18. The process of claim 17 wherein investigating the deviations comprises the steps of:

determining if the deviation is the result of an anomaly; and  
responsive to determining that the deviation is a result of an anomaly, documenting the deviation.

19. The process of claim 17 wherein investigating the deviations comprises the steps of:

determining if the deviation is the result of a business cycle;  
responsive to determining that the deviation is the result of a business cycle, documenting the deviation.

20. The process of claim 17 wherein investigating the deviations comprises the steps of:

determining if the deviation is the result of bad data capture; and  
responsive to determining that the deviation is the result of a bad data capture, documenting the bad data capture details with a problem management program and documenting the deviation with a problem management program.

21. The process of claim 17 wherein investigating the deviations comprises the steps of:

determining if the deviation is the result of an unknown reason; and  
responsive to determining that the deviation is the result of an unknown reason, documenting the deviation with a problem management program,



determining if the deviation is likely to re-occur, and  
responsive to determining that the deviation is likely to re-occur, documenting the  
required capacity plan changes.

22. The process of Claim 1 wherein handling a capacity request comprises the steps  
of:

analyzing the capacity request with a problem management program;  
extracting the requester's entitlements and standard data from a database;  
determining if the requester is entitled to have the capacity request satisfied;  
responsive to determining that the requester is entitled to have the capacity request satisfied,  
determining if any non-standard data is required to satisfy the capacity request;  
responsive to determining that non-standard data is required to satisfy the capacity request,  
submitting a request for the non-standard data to a collection team,  
receiving the non-standard data from the collection team, and  
reviewing the non-standard data received from the collection team;  
analyzing commitments and thresholds;  
determining if threshold changes are required;  
responsive to determining that threshold changes are required, using a problem manager  
program to determine the new threshold value; and  
updating the capacity plan to reflect the result of the capacity request.

23. The process of Claim 22 wherein analyzing commitments and thresholds  
comprises the steps of:

obtaining operational trend data from the database;

obtaining capacity and performance objectives from the database;  
obtaining service level attainment and customer satisfaction data from the database;  
determining if any service commitments have been missed;  
responsive to determining that one or more service commitments have been missed,  
determining resource usage at the time of the missed service commitment;  
reviewing thresholds against current service commitments;  
determining if threshold changes are required;  
responsive to determining if threshold changes are required, documenting the required  
threshold changes;  
determining if capacity plan changes are required; and  
responsive to determining that capacity plan changes are required, updating the capacity  
plan to reflect the required changes.

24. The process of Claim 1 wherein handling a capacity request comprises the steps  
of:
- analyzing the capacity request with a problem management program;
  - extracting the requester's entitlements and standard data from a database;
  - determining if the requester is entitled to have the capacity request satisfied;
  - responsive to determining that the requester is entitled to have the capacity request satisfied,  
determining if any non-standard data is required to satisfy the request;
  - responsive to determining that non-standard data is required to satisfy the capacity request,  
submitting a request for the non-standard data to a collection team,
  - receiving the non-standard data from the collection team, and
  - reviewing the non-standard data received from the collection team;

forecasting resource requirements; and  
updating the capacity plan to reflect the result of the capacity request.

25. The process of Claim 24 wherein forecasting resource requirements comprises the steps of:

gathering resource and workload requirements;  
obtaining load requirements from the database;  
obtaining historical trends from the database;  
characterizing and sizing workload requirements;  
determining and applying a projection methodology;  
forecasting and sizing periods for the workload requirements;  
translating the workload requirements to technical resource needs; and  
updating the capacity plan to reflect the technical resource needs.

26. The process of Claim 25 wherein characterizing and sizing workload requirements comprises the steps of:

identifying a unit of workload;  
determining a period of interest;  
determining a magnitude of usage;  
determining a duration of usage;  
extracting resource usage data from the database for the period of interest;  
determining the resource used per unit of workload;  
correlating the unit of workload with the resource usage data;  
applying assumptions;

applying and normalizing factors; and  
validating results with peer reviews.

27. The process of Claim 25 wherein determining and applying a projection methodology comprises the steps of:

reviewing available workload data;  
evaluating appropriateness and source of workload data;  
choosing the most appropriate projection methodology;  
applying the chosen projection methodology;  
producing forecast projections and assumptions; and  
storing the forecast projections and assumptions in the database.

28. The process of Claim 1 wherein handling a capacity request comprises the steps of:

analyzing the capacity request with a problem management program;  
extracting the requester's entitlements and standard data from a database;  
determining if the requester is entitled to have the capacity request satisfied;  
responsive to determining that the requester is not entitled to have the capacity request satisfied, documenting the entitlement failure details;  
handling the service entitlement failure; and  
notifying the requester that the request will not be fulfilled.

29. The process of Claim 28 wherein handling the service entitlement failure comprises the steps of:

determining if the capacity request is covered by a contract; and  
responsive to determining that the capacity request is not covered by the contract, advising  
the requester that the capacity request will be cancelled.

30. The process of Claim 28 wherein handling the service entitlement failure  
comprises the steps of:

determining if the capacity request is covered by a contract;  
responsive to determining that the capacity request is covered by a contract, determining if  
the requester is entitled to any available alternatives;  
responsive to determining that the requester is entitled to one or more available alternatives,  
reviewing the available alternatives with the requester to gain acceptance of at least one  
of the available alternatives; and  
responsive to gaining acceptance of at least one of the available alternatives, updating the  
capacity plan to reflect the result of the capacity request.

31. The process of Claim 28 wherein handling the service entitlement failure  
comprises the steps of:

determining if the capacity request is covered by a contract;  
responsive to determining that the capacity request is covered by a contract, determining if  
the requester is entitled to any available alternatives;  
responsive to determining that the requester is not entitled to any available alternatives,  
obtaining approval for the original request; and  
updating the capacity plan to reflect the result of the capacity request.

32. The process of Claim 1 embedded in computer program product.

33. A system for managing capacity resources in a shared computing environment comprising:

a service provider;

a plurality of service obligations;

a plurality of capacity resources; and

a capacity planner that

produces and maintains a capacity plan, wherein the capacity plan substantially identifies current and needed capacity resources and substantially describes the allocation of the current and needed capacity resources, and executes the capacity plan so that the service provider meets all service obligations.

34. The system of Claim 32 wherein the capacity planner further handles capacity requests.

35. The system of Claim 33 wherein the capacity planner further reviews capacity requests to identify capacity issues that should be resolved in a future capacity plan.

36. A system for managing capacity resources in a shared computing environment comprising:

a service provider;

a plurality of service obligations;

a plurality of capacity resources;

means for producing and maintaining a capacity plan;

means for handling capacity requests; and

means for reviewing capacity requests to identify capacity issues.